RESEARCH PROJECT SEGMENT

State: Alaska

Project No.: F-9-3 *Name:* Sport Fish Investigations of Alaska.

Study No.: G-I *Study Title:* Inventory and Cataloging.

Job No.: G-I-B *Job Title:* Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Southwest Alaska.

Period Covered: July 1, 1970 through June 30, 1971.

ABSTRACT

One lake on Kodiak Island and four on Adak Island were surveyed. Twenty-eight lakes were sampled with gill nets to determine survival and growth trends of natural and stocked populations of silver salmon, Oncorhynchus kisutch; rainbow and steelhead trout, Salmo gairdneri; Dolly Varden, Salvelinus malma; and Arctic grayling, Thymallus arcticus.

Post earthquake observations were made on fish populations and water chemistry of Ambercrombie and Mayflower lakes and Lake Rose Tead. Ambercrombie Lake contained no salt water; however, Mayflower Lake was brackish from 14 - 25 feet (bottom). Surf smelt, Hypomesus pretiosus; Pacific herring, Clupea pallasi; Irish lord, Hemilepidotus sp.; and starry flounder, Platichthys stellatus, were captured in Lake Rose Tead following a 9.9-foot high tide.

Naturally reproducing rainbow-steelhead trout populations were investigated in six systems on Kodiak Island. All data indicates that the majority of Kodiak Island steelhead spend at least two years in fresh water. Creel census, net, and hook-and-line sampling indicate that excellent spawning escapements of steelhead entered the Karluk River in 1969 and 1970.

A creel census on the Buskin River from May 1 through 30 revealed an average take of 2.3 Dolly Varden per hour, or 3.3 fish per angler trip. From June 1 through September 12, an estimated 19,931 angler hours were fished on the Buskin River and fishermen harvested approximately 1,676 silver salmon; 8,543 pink salmon, O. gorbuscha; and 559 sockeye salmon, O. nerka. An hourly average of 0.54 salmon was caught during the Buskin River creel census. Size and age data were collected from sockeye and silver salmon.

Aerial, foot, and skiff surveys of silver salmon; king salmon, O. tshawytscha; sockeye salmon; and pink salmon (on the Buskin River) indicated adequate spawning escapements.

A total of 2,589 grayling were reared to fingerling size in a natural pond and transferred to Roslyn Creek.

Capelin, Mallotus villosus, surveys on the beaches of northeastern Kodiak Island indicated no spawning on Silver, Roslyn, and Pasagshak beaches, with limited spawning on the beaches of Monashka Bay.

A study initiated to determine the timing, magnitude, and condition of salmonids migrating from Margaret and Genevieve lakes indicated very limited use of the lakes by sockeye and silver salmon, Dolly Varden, and rainbow trout.

Approximately 1,166,000 silver salmon eggs taken from 277 female salmon were artificially fertilized at Lake Miam. Average fecundity was 4,209 eggs per female.

Occurrence of threespine stickleback, Gasterosteus aculeatus, were recorded in the appropriate lake files.

RECOMMENDATIONS

1. Sample outmigrant Dolly Varden, Salvelinus malma, from the Buskin River for size and age according to a statistically valid sampling design.

2. Discontinue capelin, Mallotus villosus, investigations until sufficient manpower is available.

3. Evaluate past years of net sampling data for stocked lakes, establish stocking schedules, and shift the lake management program to management funds.

4. Continue the Buskin River anadromous fish studies under a separate job description.

OBJECTIVES

1. To determine the physical, chemical, and biological characteristics of existing and potential sport fishing streams and lakes in the Kodiak area.

2. To establish magnitude, distribution, timing, yearly fluctuations, and angler harvest of sport fish populations in the Karluk River, northeastern Kodiak Island, and areas of concern to fishery management.

3. To investigate, evaluate, and develop plans for the enhancement of anadromous and resident fish stocks.

4. To investigate sources for Dolly Varden and silver salmon egg takes which appear to have significant future value in sport fish management; to attempt small-scale pilot egg takes as a test of feasibility; and to conduct other studies related to egg taking and population evaluation as found necessary.

5. To evaluate multiple-use development projects and their effects on the area's streams, lakes, and coastal marine areas.

6. To assist as required in the investigation of public access status to the area's sport fishing waters and make specific recommendations for public fishing access sites.

TECHNIQUES USED

Standard techniques as described by Marriot (1964) and Van Hulle (1970) were used in lake surveys, analysis of water samples, creel census,

and net and seine sampling.

A downstream migrant trap was operated on the outlet of Lake Margaret from March 11 to July 18. All silver and sockeye salmon were fin clipped (adipose).

A downstream and upstream migrant trap was operated on the outlet of Lake Genevieve from May 11 to September 3. All silver salmon were fin clipped (right ventral). Dolly Varden were fin clipped (adipose).

Silver and sockeye salmon, and Dolly Varden were randomly sampled and measured (fork length in mm) and weighed (grams) at lakes Genevieve and Margaret traps.

FINDINGS

Assessment and Inventory of Sport Fish Environment

Lake and Stream Record Maintenance:

In the Kodiak-Afognak Island complex, excluding the Trinity Islands, 811 lakes were coded, listed according to location, ownership, depth, surface acres, existing fish and fisheries, and incorporated into a computer-programmed lake catalog.

A literature search to consolidate lake surveys, stocking records, creel census reports, and other related data was initiated.

Continuing Effects of the 1964 Tsunami on Kodiak Island Lakes:

Mayflower Lake was inundated by a tsunami in March 1964, and, as described by Marriott (1969), contains brackish water below 14 feet. Marriott also noted extreme supersaturations of dissolved oxygen in the 12- to 14-foot strata in 1968.

Observations in September and December, 1970, and January, 1971, indicated the average salinity from 14 to 25 feet had decreased approximately 2 ppt (from 15.8 ppt to 13.8 ppt) since 1968.

Using standard dissolved oxygen testing technique, for freshwater, extreme supersaturation of dissolved oxygen was again observed in the 12- to 14-foot strata. Analysis of water from the freshwater layer (10 feet) and the brackish layer (20 feet) indicated the Magnesium concentration was 13.8 times greater in the freshwater layer than in the brackish layer (14 ppt in freshwater, 193 ppt in brackish water). High concentrations of Magnesium can interfere with standard dissolved oxygen testing methods and result in the indicated supersaturations of oxygen noted by Marriott (1968). These tests were probably in error.

Ambercrombie Lake did not receive saltwater from the 1964 tsunami; however, the outlet spit was damaged so that a northeast wind puts spray from high tides into the lake (Alaska Department of Fish and Game, 1965).

The lake was tested for dissolved oxygen and salinity in December, 1970. No salinity was observed; the water contained 12 ppm dissolved oxygen at 0°C, and the outlet spit was still in the same condition as noted by Marriott (1965). Test net results for Mayflower and Ambercrombie lakes are presented in Table 5.

At Lake Rose Tead a reverse current flows into the lake above the 5.5-foot high-tide level. Nets were set in the lake during March, 1970, and the results are presented in Table 1.

TABLE 1 Exploratory Net Sampling, Kodiak and Adak Islands, 1970.

Lake	Date	No. Net Hrs.	Species *	No. Fish	Avg. Length (mm)	Fish/ Net Hr.	Location
Palisade	7/17	2.0	DV	8	207	4.00	Adak Island
Leonne	7/17	30.0	DV	20	221	0.67	Adak Island
Shotgun	7/16	13.5	DV	178	183	13.19	Adak Island
Smith Pond	7/20	2.0	no fish	-	-	--	Adak Island
Mitt	7/20	2.0	DV	9	206	4.50	Adak Island
Saltery	4/14-	48.0	DV	37	290	0.77	Saltery Cove,
	4/16		SH	7	591	0.15	Kodiak Island
			KK	1	483	0.02	
Lake Rose Tead	3/18-	4.5	DV	23	291	5.11	Pasagsbak Bay,
	3/20		**	56	-	1.24	Kodiak Island
	5/20	2.0	DV	3	-	1.50	
			SS	10	183	5.00	
			**	31	-	15.50	

*DV - Dolly Varden
SS - Silver salmon
SH - Steelhead trout
KK - Kokanee

**Marine species of surf smelt, Hypomesus pretiosus; Pacific herring, Clupea pallasi; Irish lord, Hemilepidotus sp.; and starry flounder, Platichthys stellatus.

Lake Inventory and Cataloging:

Saltery Lake on Kodiak Island, and Mitt, Palisades, Smith, and Shotgun lakes on Adak Island were surveyed for physical and biological characteristics. Net sampling results for these lakes are presented in Table 1.

Winter Water Chemistry and Ice Conditions:

Table 2 presents winter water chemistry and ice conditions noted on five Kodiak Island lakes where water conditions were expected to be marginal for trout survival.

TABLE 2 Water Chemistry and Ice Conditions for Five Kodiak Island Lakes, February and March, 1971.

Lake	In. Snow	In. Ice	Oxygen (ppm)	pH	Sample Depth (Ft.)	Depth at Station (Ft.)
Big (Beaver)	0.5	30	6.0	6.0	5	6
Lilly (Nyman)	0.0	28	8.0	6.5	5	5
Snag	4.0	27	6.5	6.0	5	5
Dragonfly	3.0	28	6.5	6.0	5	6
Bridge (Beaver)	4.0	30	6.0	6.0	5	7

This data reflects the extreme cold which prevailed on Kodiak Island during the 1970-71 winter. Although ice cover exceeded 27 inches on these shallow lakes, conditions remained favorable for fish survival.

Investigations of Sport Fish Populations

Steelhead-Rainbow Trout:

Scale samples and length data were collected from Karluk River steelhead, Salmo gairdneri, on April 24, 1969 (n=16) and June 11, 1970 (n=14). The April samples were collected in the upper eight miles of the river by hook and line and consisted of pre-spawning fish. The June samples were collected at the terminus of the river, Karluk Lagoon (Figure 1), by seine and consisted of post-spawning fish.

The majority (73.4%) of 1969 steelhead sampled had two annular freshwater checks and have spent two winters (40.0%) and three winters (26.7%) in saltwater. Five (16.7%) of these fish were making their second spawning migration. Table 3 presents age and sex data from 1969 and 1970 Karluk River steelhead.

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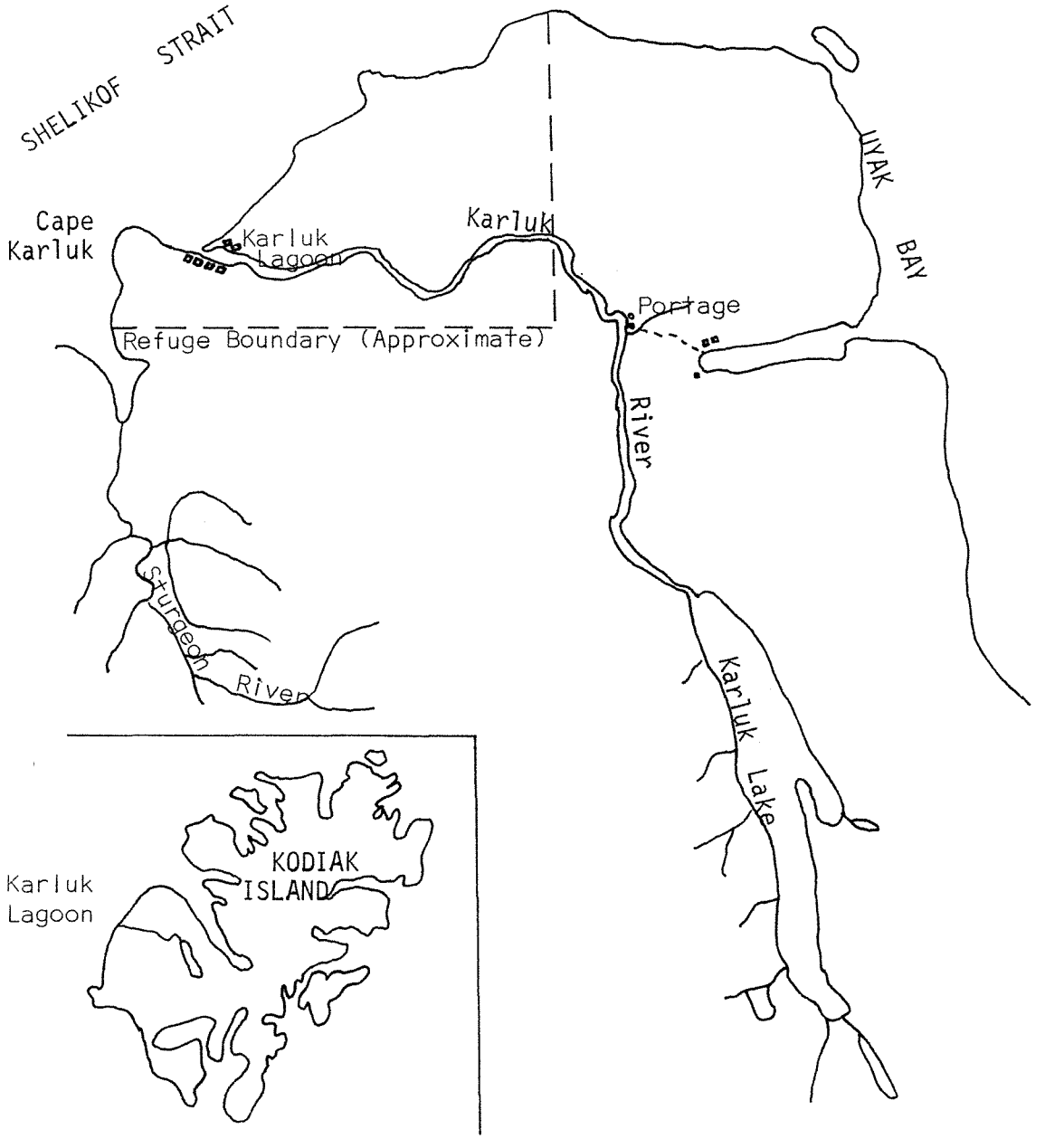

FIGURE 1 KARLUK LAKE SYSTEM.

TABLE 3 Population Characteristics of Steelhead Caught by Seine and Sport Gear, Karluk River, 1969 and 1970.

	Age Group						
	2.1	2.2	2.3	3.2	3.3	4.3	Total
1969:							
No. fish	2	12	8	6	1	1	30
Year of parent escapement	1965	1964	1963	1963	1962	1961	
% Total	6.7	40.0	26.7	20.0	3.3	3.3	100.0
Avg. size (mm)	555	576	677	607	737	737	618
No. post spawners	2	5	3	3	1	0	14
No. second spawners	0	2	3	0	0	0	5
1970:							
No. fish	4	16	6	12	2	-	40
Year of parent escapement	1966	1965	1964	1964	1963	-	
% Total	10.0	40.0	15.0	30.0	5.0	-	100.0
Avg. size (mm)	543	634	758	683	795	-	666
No. second spawners	0	3	3	0	2	-	8

On June 11, subsistence fishermen were releasing spawned out steelhead and retaining king salmon, Oncorhynchus tshawytscha, and sockeye salmon, O. nerka. Seine hauls made in the lagoon after June 25 failed to produce steelhead.

The Karluk Lagoon was seined approximately every two weeks from June 11 to September 9, 1970. The first inmigrant adult steelhead was taken on August 19. One seine haul on September 9 netted 20 inmigrants. Seventeen hours of hook-and-line sampling in the Portage area of the Karluk River on October 29 through 30 produced 21 steelhead (1.2 fish per hour). All data indicates excellent spawning escapements of steelhead were attained in the Karluk system in 1969 and 1970.

Table 4 presents age and size data collected from rainbow-steelhead trout from Saltery Lake, Portage Lake, Upper Station Creek, and Little Afognak Lake. The small samples preclude further statistical treatment of this data; however, the actual population numbers are believed small.

TABLE 4 Population Characteristics of Native Rainbow-Steelhead Trout Populations in Four Kodiak Area Waters, 1970.

	Age Group					Total
	2.2	3.2	4.2			
Saltery River:						
No. fish	2	4	1			7
% total	28.6	57.1	14.3			100.0
Avg. size (mm)	567	589	648			591
	2.0	3.0	4.0	5.0	3.3	
Portage Lake:						
No. fish	1	7	4	1	1	14
% total	7.2	50.0	28.6	7.1	7.1	100.0
Avg. size (mm)	195	216	263	270	635	233*
% mature	0	71.4	75.0	100.0	100.0	
	2.0	3.0	4.0	5.0	2.2	
Upper Station Lake:						
No. fish	25	6	14	2	1	48
% total	52.1	12.5	29.1	4.2	2.1	100.0
Avg. size (mm)	223	257	327	419	686	267*
% mature	0	66.6	57.1	100.0	100.0	
	2.0	3.0	4.0			
Little Afognak Lake:						
No. fish	7	2	1			10
% total	70.0	20.0	10.0			100.0
Avg. size (mm)	203	263	395			234
% mature	0	0	100.0			

*Freshwater growth only.

Assessment of Kodiak Island Lake Stocking Program:

Nets were fished in 19 lakes on northeastern Kodiak Island stocked since 1962, and two lakes on Adak Island stocked with rainbow trout in 1968. Table 5 presents the 1970 lake sampling data.

TABLE 5 Lakes Sampled for Population Analysis, Kodiak and Adak Islands, 1970.

Lake	Date	Net Hrs.	Species *	Brood Year	No. Caught	Avg. Length (mm)	Avg. Weight (Lbs)	Fish/ Net Hr.
Ambercrombie	8/12	24.0	SS	1968	11	197	0.30	0.46
Island	8/13	17.5	DV	--	8	197	--	0.46
			RT	1967	2	234	0.38	0.11
Genevieve	6/10	21.5	DV	--	21	278	--	0.98
Lilly Pond	6/15	18.5	SS	1969	5	134	--	0.27
Margaret	6/10	21.5	--	--	0	--	--	--
Aurel	6/16	21.5	GR	1968	2	257	--	0.09
Caroline	6/16	22.5	—	--	0	--	--	--
Cicely	6/16	21.0	RT	1966	1	394	--	0.05
Jack	6/15	24.0	RT	1965	2	339)	--)	
			RT	1968	1	181)	--)	0.17
			RT	1969	1	121)	--)	
Lee	6/15	24.0	--	--	0	--	--	--
Dragonfly	6/10	21.5	RT	1969	34	169	0.13	1.58
Snag	9/ 8	17.5	RT	1967	1	246	--	0.06
Barry Lagoon	7/13	46.0	DV	--	10	295	--	0.22
			SS	1965	2	368	1.2	0.04
			SS	1969	24	206	0.31	0.52
Bull	6/18	27.5	--	--	0	--	--	--
	7/13	18.5	RT	1967	1	381	1.80)	0.16
			RT	1968	1	270	0.65)	0.16
			RT	1969	1	216	0.30)	
Lupine	6/18	26.0	RT	1969	4	217	--	0.15
Jupiter	8/ 4	37.0	RT	1966	1	448	2.65)	
				1967	1	293	0.80)	0.11
				1968	2	267	0.55)	
Saturn	8/ 4	19.5	RT	1966	1	334	1.05)	0.10
			RT	1967	1	310	0.80)	
Pony	6/23	50.0	SS	1968	2	229	--)	0.16
			SS	1969	6	125	--)	
Cascade	8/20	20.0	RT	1966	3	316	0.83)	0.45
			RT	1969	6	165	0.13)	
North**	7/16	6.3	RT	1968	11	225	--	1.75
			DV	--	24	265	--	3.81
Haven Pond**	7/16	8.0	RT	1968	16	218	--	2.00

*DV - Dolly Varden SS - Silver Salmon
RT - Rainbow Trout GR - Grayling

**Adak Island

The data in Table 5 was collected for the purpose of managing existing fisheries on the northeastern portion of Kodiak Island and is not complete enough for statistical treatment. The yearly sampling of most lakes should be continued under a management program.

Silver Salmon Escapement Counts:

Table 6 shows the silver salmon escapement estimates for northeastern Kodiak Island in 1970.

TABLE 6 Silver Salmon Escapement Estimates, Northeastern Kodiak Island, 1970.

System	Date	Survey	Spawning Escapement Count	Spawning Escapement Est.	Sport Catch Est.	Total Run Est.
Buskin Lake	10/8	Aerial	1,000	1,200	2,500*	3,700
Lake Rose Tead	**	Aerial Foot	600	1,000	1,000+	2,000+
Salonie Creek	10/8	Aerial	500	500	200	700
Roslyn Creek	10/8	Aerial	85	No est.	No est.	None
Lake Miam	**	Foot Aerial	2,500	3,000	Negligible	3,350
Pillar Creek	10/1	Foot	31	35	25	60
Island Lake	10/1	Foot	57	60	50	110
Kalsin River	10/8	Aerial	150	150	20	170
American River	10/8	Aerial	375	450	50	500
Olds River	10/8	Aerial	250	275	25	300
Lake Genevieve	11/3*	Foot	31	35	15	50
Lake Margaret	11/3	Foot	2	2	0	10

*Creel census indicated 1,676 silver salmon taken from August 1 - September 12. The total harvest is approximately 2,500 fish.
**Periodic surveys.
***347 artificially spawned.

Silver salmon escapements for northeastern Kodiak Island appeared very good. The total silver salmon catch for northeastern Kodiak Island was approximately 3,900 fish and the spawning escapement was in excess of 6,700 fish.

King Salmon:

King salmon investigations were limited to one aerial survey of the Karluk River and a collection of 19 scale samples from Commercial Fisheries Division personnel operating the weir at Karluk Lake. The July 26

aerial survey by Commercial Fisheries Division personnel indicated at least 3,900 king salmon spawned in the Karluk River in 1970.

Grayling Stocking and Transplants:

Cicely Lake was stocked in 1968 with 10,000 grayling fry. By June, 1970 grayling in Cicely Lake were approximately 250 mm fork length. Grayling migrated from Cicely Lake to Aurel Lake and most of the sport fishing for grayling developed in Aurel Lake. Grayling appearing to be in spawning condition were observed in the outlet of Aurel Lake in late May.

Cascade Lake was rehabilitated in 1965, stocked with 20,000 fry in 1966, and 35 adults in 1967. No grayling were taken in 20.0 hours of net sampling in Cascade Lake. Shoreline observations in 1969 indicated good grayling reproduction (Van Hulle, 1970); on August 20, large numbers of grayling and rainbow trout fry were in the inlet and shoal areas. In 1968, Marriott also noted good grayling reproduction in Cascade Lake; however the population does not seem to increase. Possibly, Cascade Lake grayling are migrating over the outlet falls.

A four-foot deep, one-acre beaver pond on Cliff Point was selected as a site to experimentally rear grayling sac-fry to fingerling size for stream stocking. The pond drained 60 feet to a 36-inch culvert, with a four-foot drop on the end, and then to Middle Bay. On June 4, 30,000 sac-fry were introduced into the pond; on July 30 (56 days later) grayling were observed below the pond in the outlet. Rotenone was used to collect all grayling (n=63) in the outlet. These fish averaged 60 mm, 216 fish per pound. A trap was installed below the outlet culvert and a total of 2,859 grayling, averaging 227 fish per pound, were captured between July 30 and October 21, 1970, and planted in Roslyn Creek. The rearing pond was devoid of grayling when drained on November 15, 1970.

An unknown number of fish were lost to natural predators and killed by the turbulent water in the outlet trap.

Capelin Observations:

Foot and aerial surveys were conducted along the beaches of Chiniak and Monashka bays on the last high-tide series in May and early June. No capelin, Mallotus villosus, were observed. On June 2, 1970, at least 100 people were fishing for capelin on the night tide along the Chiniak beaches. No capelin were observed in the Chiniak-Pasagshak Bay area; however, some fish reportedly spawned on the beaches of Monashka Bay.

Buskin River System Anadromous Fish Studies

Most of the sport fishing effort on Kodiak Island is on the Buskin River. Figure 2 shows the location of lakes and connecting streams in the Buskin River system. The possibility of rehabilitating lakes Margaret and Genevieve for rainbow trout production was explored.

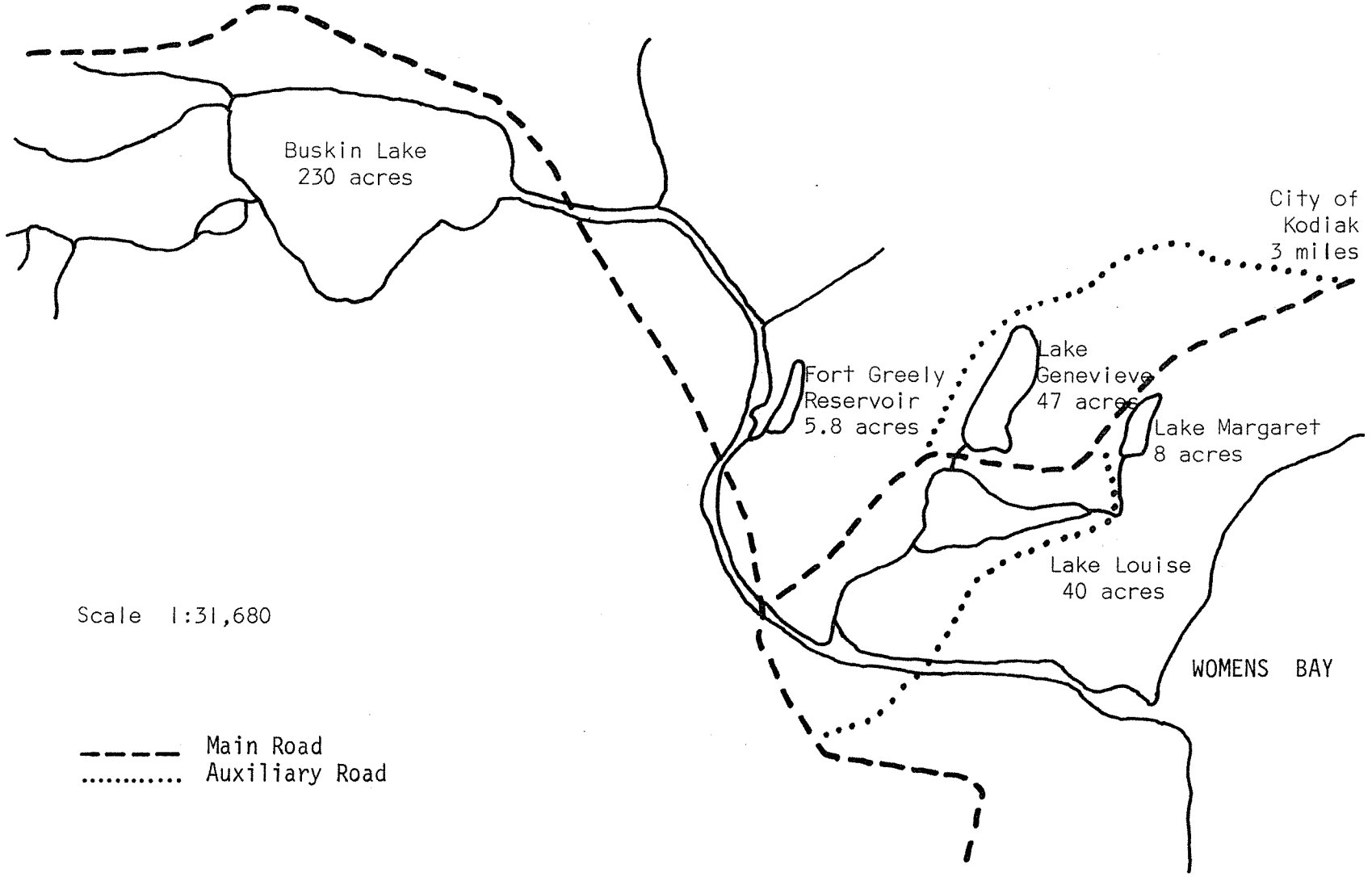

FIGURE 2 BUSKIN LAKE SYSTEM.

TABLE 7 Buskin River Creel Census, June 1 through September 12, 1970.*

Time Period	Completed Angler Interviews	Angler Trips	Tot. Angler Hrs.	Hrs. Fished by Completed Anglers	Hrs. Avg. Trip	Calculated No. Fish Caught**			Fish/Hr.		
						SS	PS	RS	SS	PS	RS
7/1 - 7/5:											
Weekends	75	880	1,575	134.0	1.79	--	--	158	0.00	0.00	0.10
Weekdays	91	1,040	2,340	204.5	2.25	--	--	351	0.00	0.00	0.15
7/5 - 8/1:											
Weekends	145	1,043	1,982	275.0	1.90	--	1,031	--	0.00	0.52	0.00
Weekdays	135	2,594	4,981	259.0	1.92	--	3,935	50	0.00	0.79	0.01
8/1 - 8/16:											
Weekends	87	529	1,217	200.0	2.30	49	1,047	--	0.04	0.86	0.00
Weekdays	34	1,032	2,219	73.0	2.15	67	2,152	--	0.03	0.97	0.00
8/16 - 9/1:											
Weekends	20	610	1,739	57.0	2.85	157	122	--	0.09	0.07	0.00
Weekdays	52	1,335	1,442	56.0	1.08	721	159	--	0.50	0.11	0.00
9/1 - 9/12:											
Weekends	79	1,224	1,516	157.0	1.99	682	97	--	0.28	0.04	0.00
Weekdays			920								
Total	718	10,287	19,931	1,415.5	1.97	1,676	8,543	559	0.19***	0.53***	0.05***

*6:00 AM through 10:00 PM.
**SS - Silver salmon
PS - Pink salmon
RS - Sockeye salmon
***Mean catch during period fish were available.

Creel Census and Escapement Surveys:

A creel census was conducted on the Buskin River to determine the size composition of sport-caught Dolly Varden and to determine the present utilization of sockeye salmon; pink salmon, O. gorbuscha; and silver salmon runs.

From May 1 to 30, a total of 79 Dolly Varden anglers were interviewed upon completion of their fishing trip. Each angler fished approximately 1.5 hours per trip and averaged 3.3 Dolly Varden per trip. The May sport fishery is on Dolly Varden migrating out of Buskin Lake to Womens Bay.

Table 7 presents catch information on Buskin River sockeye, pink, and silver salmon.

From June 1 to September 12, anglers fished 19,931 hours on the Buskin River, and by September 12, when the creel census terminated, approximately 10,778 salmon were harvested.

The silver salmon fishery lasted until October 15 and the total sport fish catch was approximately 2,500 fish. An estimated total of 1,200 silver salmon spawned in the Buskin River and its tributaries.

An August 24 foot survey resulted in a visual count of 44,250 spawning pink salmon in the Buskin River. The seasonal sport harvest was calculated at 8,543 fish.

A total of 559 sockeye salmon were taken in the sport fishery. An estimated 1,900 spawned on the west shore of Buskin Lake and 785 adult sockeye counted into Lake Genevieve through the outlet trap. The final estimate for adult sockeye salmon in the Buskin system in 1970 was 3,244 fish.

Observations on Lakes Margaret and Genevieve Anadromous Fish Populations:

A study was initiated to determine the timing, number, and condition of salmonids migrating from lakes Margaret and Genevieve and the approximate number of anadromous fish reared in these lakes and caught as returning adults by Buskin River anglers. It is considered possible that one or both lakes could be rehabilitated and stocked with resident rainbow trout without endangering the present Buskin River sport fishery.

The downstream migrant trap was operated at the outlet of Lake Margaret from March 11 to July 18, and all outmigrants were counted. A total of 1,234 silver salmon smolt and 41 parr migrated from Lake Margaret with the peak of migration occurring May 20 through June 8. Of 571 silver salmon smolt sampled for age and size data, all were age class 2.0, and averaged 119 mm in length; all silver salmon were marked by removal of the adipose fin.

Table 8 presents size and timing data for silver salmon smolts from lakes Margaret and Genevieve.

TABLE 8 Silver Salmon Smolt Outmigration, Lakes Genevieve and Margaret, 1970.

	No. Smolt	%	Cumulative %	Size: Sample No.	Size: Length (mm)	Size: Weight (gm)
Lake Genevieve:						
5/10 - 5/19	278	27.8	27.8	166	140	--
5/20 - 5/29	306	30.6	58.3	208	124	--
5/30 - 6/ 8	347	34.6	92.1	128	127	18.8
6/ 9 - 6/18	55	5.5	98.5	52	120	17.5
6/19 - 6/28	3	0.3	98.8	3	123	22.2
6/29 - 7/ 8	6	0.6	99.4	6	138	27.6
7/ 9 - 7/18	6	0.6	100.0	0	--	--
7/19 - 7/28	0	--	--	--	--	--
7/29 - 9/ 7	0	--	--	--	--	--
	1,001	100.0	100.0	563	129	18.8
Lake Margaret:						
3/11 - 3/20	1	0.0	0.0	0	--	--
3/21 - 3/30	2	0.2	0.2	0	--	--
3/31 - 4/ 9	15	1.2	1.4	0	--	--
4/10 - 4/19	23	1.9	3.3	0	--	--
4/20 - 4/29	0	0.0	3.3	0	--	--
4/30 - 5/ 9	28	2.3	5.6	0	--	--
5/10 - 5/19	94	7.6	13.2	80	128	--
5/20 - 5/29	565	45.8	59.0	262	122	19.7
5/30 - 6/ 8	431	34.9	93.9	159	114	14.6
6/ 9 - 6/18	67	5.4	99.3	67	108	13.9
6/19 - 6/28	3	0.3	99.6	3	117	--
6/29 - 7/ 8	5	0.4	100.0	0	--	--
7/ 9 - 7/18	0	--	--	--	--	--
	1,234	100.0	100.0	571	119	17.5

A total of 19 sockeye salmon smolts, 72 Dolly Varden, and 12 rainbow trout were also trapped at Lake Margaret. Sculpin, Cottus sp., pink salmon fry, and numerous stickleback, Gasterosteus aculeatus, were observed but not counted.

The Lake Genevieve outlet trap was installed on May 11, 1970, and captured both downstream and upstream migrants. The downstream trap was blocked from July 15 to 26, and then operated to August 28 when high water

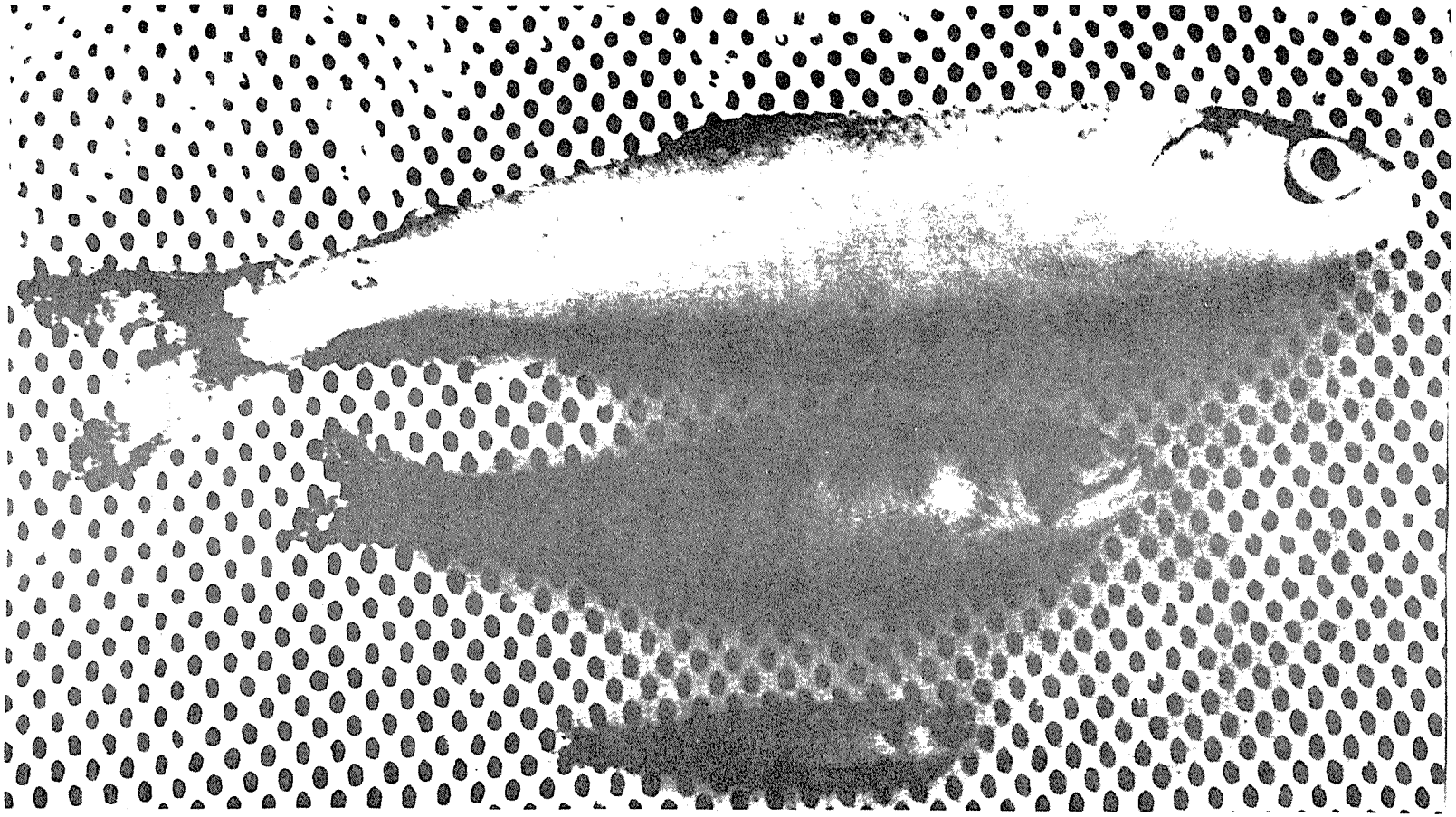

FIGURE 3 FROM TOP TO BOTTOM: AGE CLASS 2.0 SILVER SALMON SMOLT; AGE CLASS 1.0 SILVER SALMON PARR; AND AGE CLASS 0.0 SILVER SALMON FINGERLING. THESE FISH WERE CAPTURED AT LAKE GENEVIEVE WEIR IN JUNE, 1970.

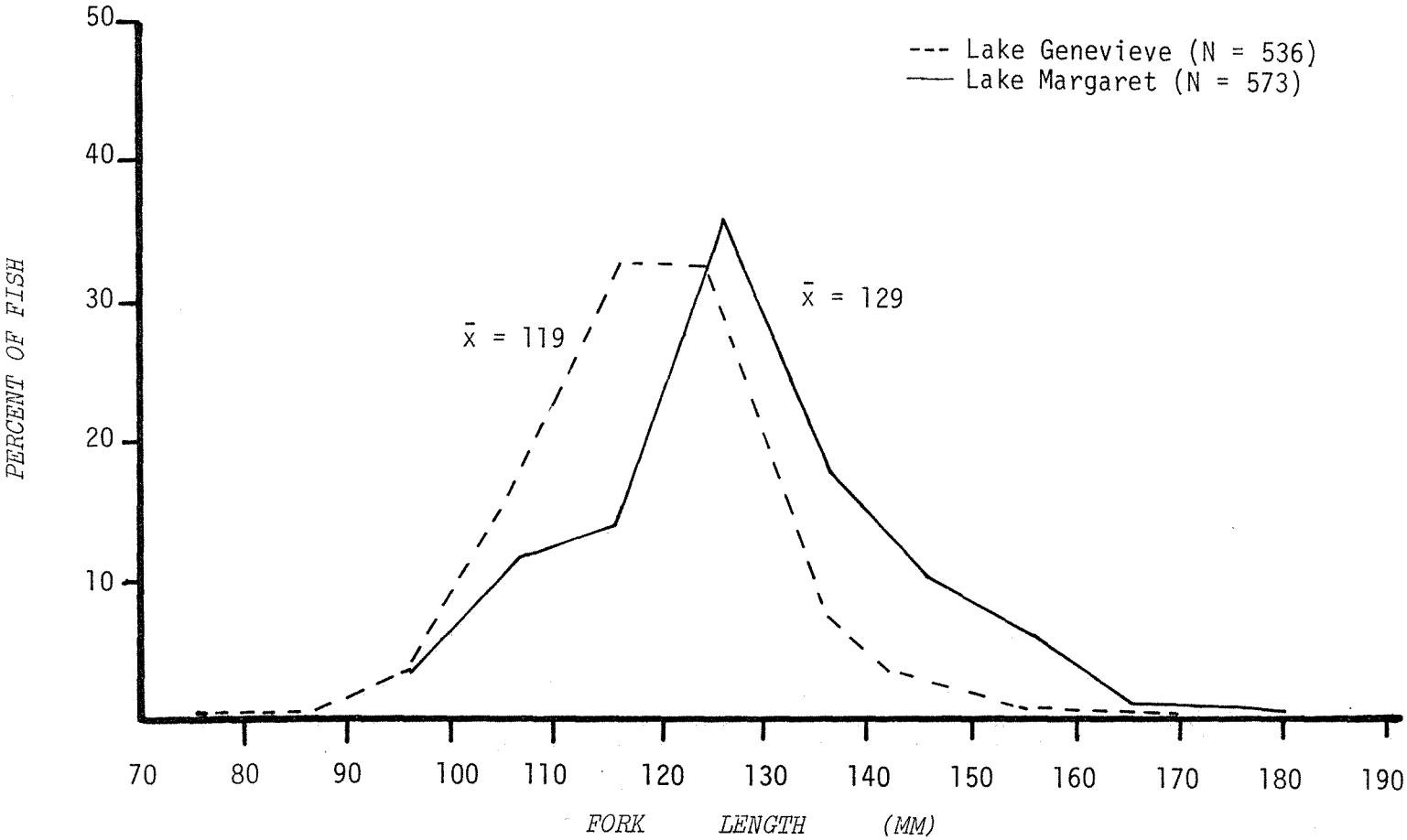

FIGURE 4 LENGTH DISTRIBUTION OF SILVER SALMON SMOLT BY 10 MM INTERVALS COLLECTED IN THE DOWNSTREAM WEIR TRAPS ON LAKES GENEVIEVE AND MARGARET, 1970.

caused the removal of all screen panels until September 3. The trap was completely removed on September 12.

Eighteen silver salmon and two Dolly Varden entered the downstream trap on the first day of operation and the outmigration peaked from May 20 through June 8. A total of 1,001 silver salmon smolt (plus 67 parr) were captured and marked by removal of the right ventral fin. The start of the salmon and Dolly Varden outmigration was apparently missed. A random sample of 563 (56.2%) of the silver salmon smolts were aged and determined to be age class 2.0. These fish averaged 129 mm; silver salmon parr (age class 1.0) averaged 75 mm. A sample (n=68) of fry (age class 0.0) examined at the weir on July 7, 1970, averaged 54 mm and 3.6 grams (Figure 3).

Figure 4 illustrates the difference in size distribution of lakes Genevieve and Margaret silver salmon smolt.

A total of 279 sockeye salmon smolt migrated from Lake Genevieve between May 19 and July 12, with no noticeable peak outmigration occurring. Twenty-eight sockeye salmon smolt (10.0%) were sampled and averaged 93.6 mm at 8.5 grams. All were age class 1.0.

From June 15 through August 27, 785 adult sockeye salmon moved into Lake Genevieve. High water necessitated the removal of upstream trap screens from August 28 to September 3, and the number of adult sockeye salmon entering the lake was probably in excess of 1,000 fish.

From June 16 to July 7, 50 adult sockeye salmon were weighed, measured, and aged (50% of the inmigration to July 7; 6.3% of the total counted upstream).

TABLE 9 Age and Length of Adult Sockeye Salmon Sampled at Lake Genevieve Weir, June 16 to July 7, 1970.

Age Class	No. Fish	Avg. Length (mm)	%	Year Parent Escapement
1.1	7	380	14.0	1967
1.2	31	515	62.0	1966
1.3	4	545	8.0	1965
2.2	8	535	16.0	1965

During the first 10 days of operation, 338 Dolly Varden migrated from Lake Genevieve. By July 13, 495 Dolly Varden had migrated from the lake and averaged 192 mm in length (n=259)

A gill net fished for 21.5 net hours on June 10 produced 21 Dolly Varden averaging 278 mm in length. Resident Dolly Varden were observed in the lake throughout the summer.

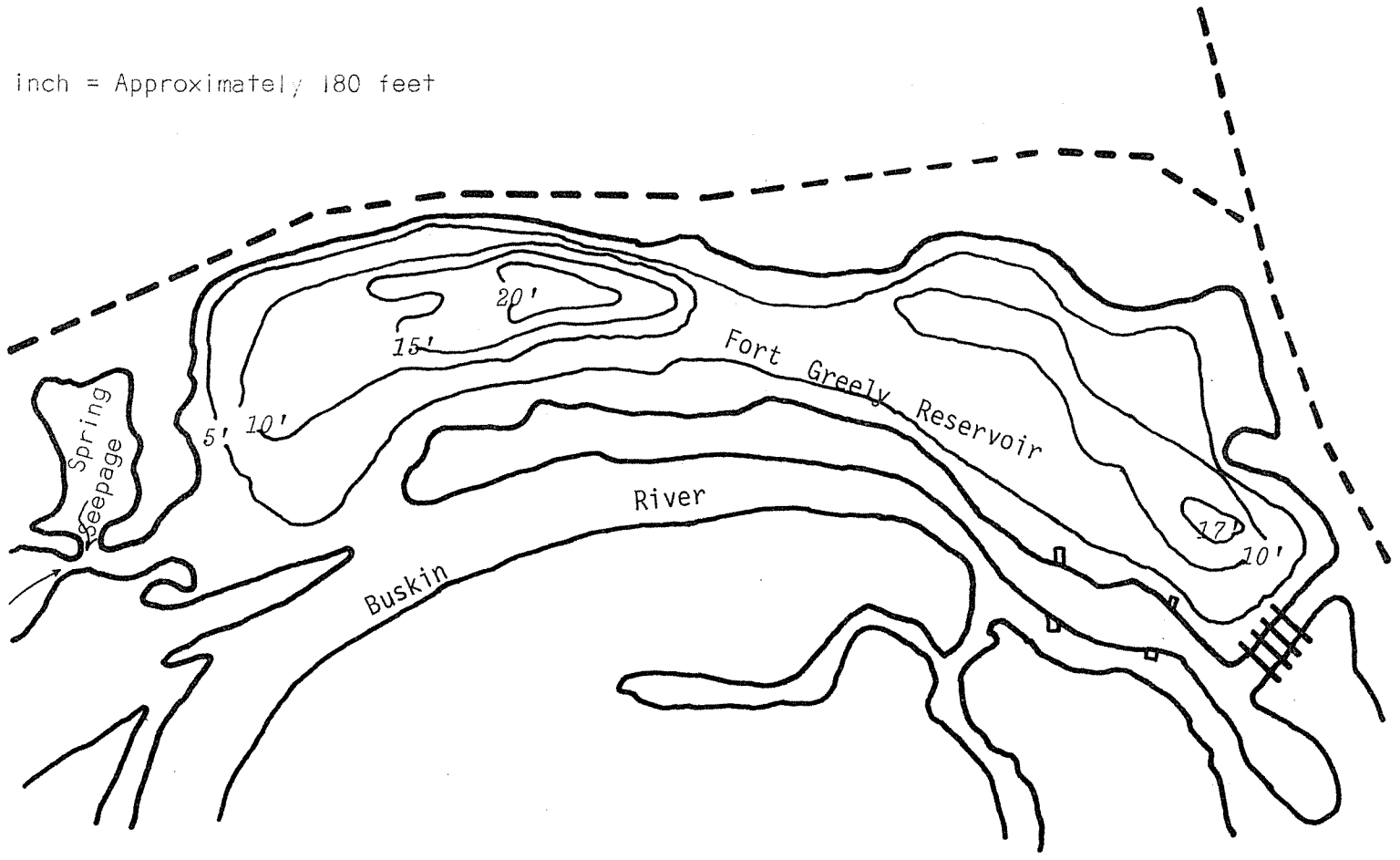

FIGURE 5 FORT GREELY RESERVOIR T28S R20W Sec. 10 SM, KODIAK NAVAL STATION.

When the trap was removed on September 12, 267 anadromous Dolly Varden had moved upstream into the lake. An adequate sample was not measured to determine average inmigrant size and the entire inmigration was not enumerated. The majority of inmigrants were, however, noticeably larger than the outmigrants and most were assuming spawning coloration.

A total of 18 rainbow-steelhead trout were taken by hook and line and captured in the lakes Genevieve and Margaret weirs. Seven fish were age class 2.0 (178 mm), six age class 3.0 (198 mm), two age class 4.0 (263 mm), and three age class 3.2 (643 mm).

In an attempt to create a steelhead fishery in the Buskin River, it was decided to renovate the 5.8 surface-acre Fort Greely Reservoir and create a rearing pond for steelhead smolts. The reservoir was mapped and a survey made of the dike separating it from the Buskin River. Figure 5 shows the bottom contour of the reservoir and the break in the dike which needs to be repaired.

Egg Take Investigations

An experimental silver salmon egg take was conducted at Lake Miam, T31S, R21W, Section 13, SM, where an estimated 3,000 (Table 6) silver salmon spawned. The fish were seined at the outlet of Lake Miam and held for one-to-two days.

A total of 176 females were stripped of eggs on October 16, and 101 females on October 18. Approximately 70 males were used to fertilize the eggs. The eggs were water hardened, flown directly to Anchorage, and delivered to the Fire Lake Hatchery at Eagle River.

A total of 769,000 eggs were taken on October 16 with 88.3% surviving to the eyed stage. The October 18 egg take produced 397,000 eggs, of which 96.9% survived to the eyed stage. On October 29, the majority of Lake Miam silver salmon were spawned out.

TABLE 10 Lake Miam Silver Salmon Egg Take, October, 1970.

Total No. Females Stripped	277
Total No. Males Stripped	70
Total No. Eggs	1,166,000
Approximate Avg./Female	4,209
Mortality to Eyed Stage	8.1%

A large number of silver salmon fry were observed in the lake and lake outlet; Lake Miam may have excellent potential as a future silver salmon egg-take site.

Public Access to Sport Fishing Waters

Recommendations to maintain public access to Saltery Lake, Lake Rose Tead and Pasagshak River, Pony Lake, and Lake Miam were made to the Habitat Section.

The Kodiak Island Borough was informed of the Alaska Department of Fish and Game's desire to maintain public access to the Three Sisters Lakes in Bells Flats, and Beaver and Orbin lakes in the same area. The Borough subsequently retained the lake shore of Beaver Lake (also called Bridge) for public recreation. A portion of land on Orbin Lake was also retained for angler access.

The Commanding Officer at the Satellite Tracking Station, Chiniak, was requested to remove or modify signs denying angler access to the Hidden Lakes on Sequel Point. A number of the signs have been removed and less restrictive signs are to be posted at the station entrance.

Signs denoting lake names and trail locations have been installed for most of the stocked lakes on northeastern Kodiak Island.

Evaluation of Multiple Use

Assistance was given to the Division of Commercial Fisheries in obtaining flow data from Pillar Creek, Olds River, and Kalsin River. It was recommended that the city of Kodiak be denied a permit to divert water from its upper reservoir until a minimum flow of 9 cfs can be established in the lower creek.

Requests to operate heavy equipment in Chiniak Creek were reviewed. Recommendations were made to the Forest Service regarding "green belts" around Portage Lake on Afognak Island and the placement of a fish ladder on the main tributary to Seal Bay. A recommendation was made to the State Division of Lands to allow no logging within 100 yards of each bank on Roslyn Creek and maintain this area for recreation.

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